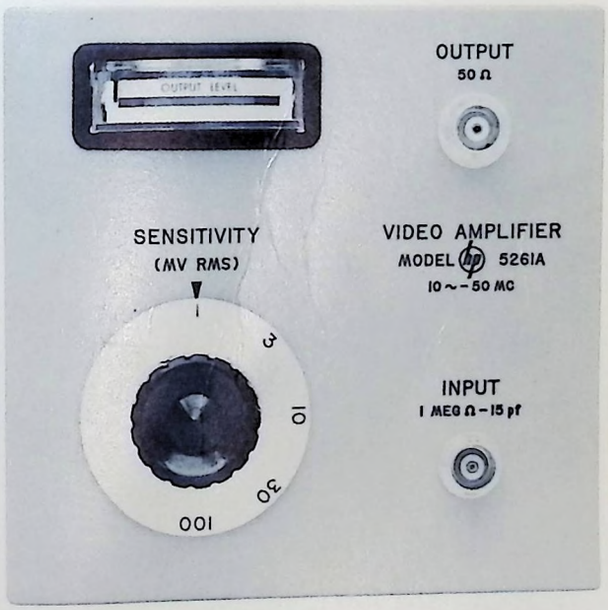
OPERATING AND SERVICE MANUAL

VIDEO AMPLIFIER

5261A



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HP 5261A

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MANUAL CHANGES

MANUAL DESCRIPTION

INSTRUMENT: 5261 Video Amplifier

SERIAL PREFIX: 1124A

DATE PRINTED: SEPT 1972

HP PART NO: 05261-9011

CHANGE DATE: February 16, 1973

(This change supersedes all earlier dated changes)

- Make all changes listed as ERRATA.
- Check the following table for your instrument's serial prefix or serial number and make listed change(s) to manual.

IF YOUR INSTRUMENT HAS SERIAL PREFIX OR SERIAL NUMBER	MAKE THE FOLLOWING CHANGES TO YOUR MANUAL	IF YOUR INSTRUMENT HAS SERIAL PREFIX OR SERIAL NUMBER	MAKE THE FOLLOWING CHANGES TO YOUR MANUAL

► NEW OR REVISED ITEM

ERRATA

Page 1-1, Paragraph 1-7:
Change "HP 10503-6001" to "HP 10507-6001."

► Page 6-4, Table 6-1:
Delete MP5 05261-2006 PANEL: FRONT OPTION A85 (LIGHT GRAY)

►Page 6-6, Table 6-2:
Delete 05261-2006 PANEL: FRONT OPTION A85 (LIGHT GRAY)

CERTIFICATION

The Hewlett-Packard Company certifies that this instrument was thoroughly tested and inspected and found to meet its published specifications when it was shipped from the factory. The Hewlett-Packard Company further certifies that its calibration measurements are traceable to the U.S. National Bureau of Standards to the extent allowed by the Bureau's calibration facility.

WARRANTY AND ASSISTANCE

This Hewlett-Packard product is warranted against defects in materials and workmanship. This warranty applies for one year from the date of delivery, or, in the case of certain major components listed in the manual, for the specified period. We will repair or replace products which prove to be defective during the warranty period provided they are returned to Hewlett-Packard. No other warranty is expressed or implied. We are not liable for consequential damages.

Service contracts or customer assistance agreements are available for Hewlett-Packard products that require maintenance and repair on-site.

For any assistance, contact your nearest Hewlett-Packard Sales and Service Office.

VIDEO AMPLIFIER

5261A

SERIAL PREFIX: 1124A

This manual applies directly to HP Model 5261A Video Amplifiers having serial number prefix 1124A.

OLDER INSTRUMENTS

This manual with changes provided in the Appendix also applies to models having serial prefix numbers 301, 311, 510, 960, and 1104A.

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Printed: SEP 1972

STOCK NO. 05261-9011

PRINTED IN U.S.A.

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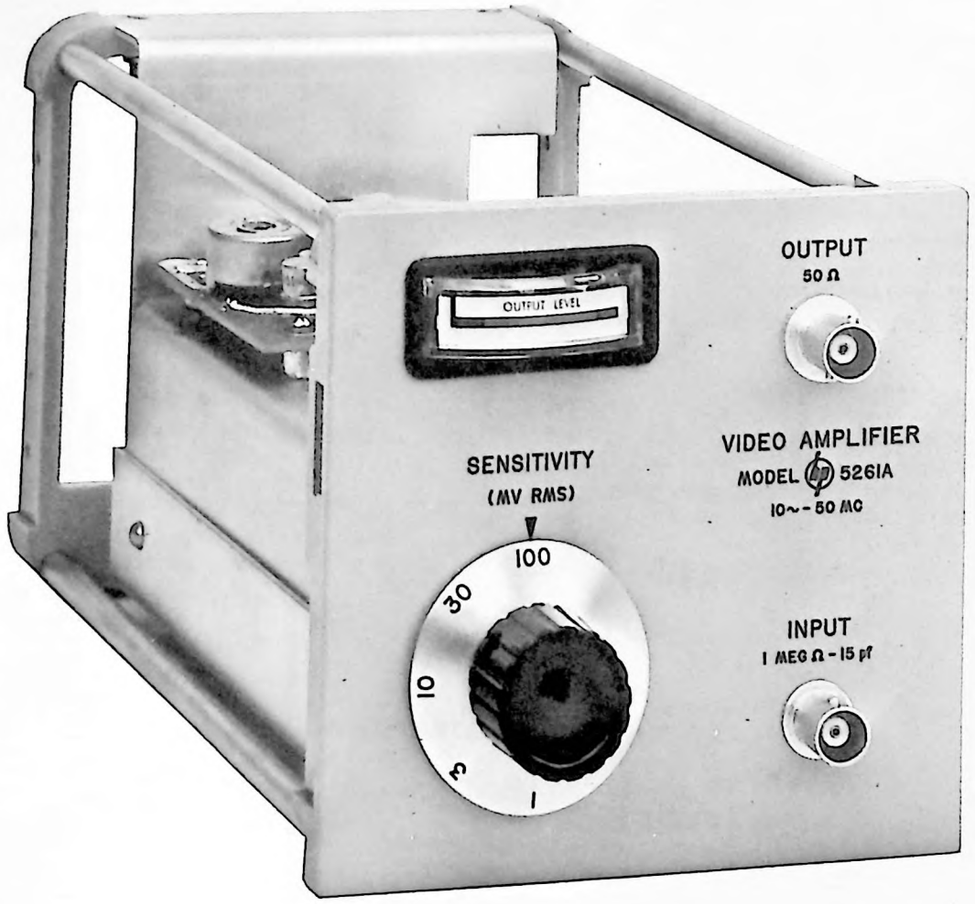
Figure 1-1. Model 5261A



BNC-BNC cable

SECTION I
GENERAL INFORMATION

1-1. INTRODUCTION.

1-2. DESCRIPTION.

1-3. The Hewlett-Packard Model 5261A Video Amplifier is a plug-in unit which increases the sensitivity of the Model 5243L or 5245L Electronic Counter. The Model 5261A provides for measurement of signals as low as 1 millivolt over the frequency range of 10 cps to 20 Mc (5243L) or 50 Mc (5245L). The input impedance is 1 megohm and may be increased to 10 megohms by using a 10:1 divider probe (hp stock no. 10003A). An output signal is available at the OUTPUT 50-ohm connector for monitoring the Video Amplifier output or for activating external instruments. This signal is identical in frequency and amplitude to the amplified signal supplied to the counter input circuit.

1-4. INSTRUMENT IDENTIFICATION.

1-5. Hewlett-Packard uses a two-section serial number mounted on the rear panel. Earlier instruments use an eight-digit serial number (000-00000). The first three digits are a serial prefix number; the last five digits refer to the specific instrument. Later instruments use a nine-digit serial number (0000A00000). The first four digits are the serial prefix and the last five digits refer to the specific instrument. If the serial prefix on your instrument does not appear on the title page of this manual, there may be differences between the manual and your instrument. If there are differences, they will be described in a change sheet included with the manual.

1-6. ACCESSORY SUPPLIED.

1-7. A 50 ohm, low microphonic cable HP 10503-6001, with BNC connectors is supplied in the package with the Model 5261A.

1-8. ACCESSORIES AVAILABLE.

1-9. Table 1-2 lists the accessories available for the Model 5261A Video Amplifier.

Table 1-2. Accessories Available

Description	hp Stock No.
10:1 divider probe, 10 pf shunt 600V max., dc to 40 Mc	10003A
50-ohm feed-through termination	10100A
50-conductor extender cable	10506C

Table 1-1. Specifications*

BANDWIDTH:
10 cps to 50 Mc with 5245L; 10 cps to 20 Mc with 5243L

INPUT SENSITIVITY:
1 mv to 300 mv rms

INPUT IMPEDANCE:
Approximately 1 megohm, 15 pf shunt; hp 10003A Probe increases impedance to 10 megohms, 10 pf shunt

ATTENUATOR RANGES:
1, 3, 10, 30, and 100 mv rms

MAXIMUM INPUT:
100 volts dc, 5 volts rms (ranges: 1, 3, 10, 30, 100 mv)

MONITOR:
Meter shows when the signal level is acceptable to the counter

ACCURACY:
Retains accuracy of 5243L or 5245L Electronic Counter

50 OHM OUTPUT:
Separate BNC front panel output for oscilloscope monitoring or for driving external equipment; 50-ohm source impedance. On amplifier's most sensitive attenuator range, 1 mv rms at input results in at least 100 mv rms at auxiliary output into 50-ohm load. Maximum undistorted output is 300 mv rms into 50-ohm load.

ACCESSORY FURNISHED:
hp 10507A Low Microphonic 50-ohm cable, 4 ft long (1220 mm), BNC connectors

ACCESSORIES AVAILABLE:
hp 10003A 10:1 Probe, 10 pf shunt, 600 volts maximum; hp 10100A 50-ohm Feed-thru Termination, 10506B Extender Cable

WEIGHT:
Net 2 lb (0, 90 kg); shipping 8 lb (3, 8 kg)

POWER:
Supplied by 5243L or 5245L Electronic Counter

*When installed in the hp Model 5243L or 5245L Electronic Counters

SECTION II
INSTALLATION

2-1. INITIAL INSPECTION.

2-2. As soon as the Model 5261A is received, verify that the instrument is intact and as ordered. Inspect the plug-in for any physical damage such as scratched panel, broken knob, or bent connectors. If damage is found, refer to the warranty page at the rear of this manual and Paragraph 2-5 for shipping and repackaging instructions.

2-3. STORAGE AND RESHIPMENT.

2-4. ENVIRONMENT. Conditions during storage and shipment should be limited as follows:

a. Maximum temperature 167°F (75°C).

b. Minimum temperature -40°F (-40°C).

2-5. PACKAGING. To protect your instrument during shipment or storage, use the best packaging methods available. Your Hewlett-Packard field office can provide materials similar to those used for original factory packaging. Contract packaging companies can provide dependable custom packaging on short notice.

a. If possible, use the original container designed for the instrument. Otherwise, use a strong carton (350 lb/sq inch bursting strength) or wooden box to house the instrument.

b. Wrap the instrument in heavy paper or plastic before placing it in the shipping container.

c. Use plenty of packing material around all sides of the instrument and protect the front panel with cardboard strips.

d. Seal the package with strong tape or metal bands. Mark with "Delicate Instrument."

e. Refer to the warranty page at the rear of this manual and check with your Hewlett-Packard field office for shipping instructions. All correspondence should refer to an instrument by model number and the full, eight-digit serial number.

2-6. INSTALLATION.

2-7. To install the Video Amplifier in the compartment provided at the right side of the counter front panel, proceed as follows:

a. Remove AC power from the counter by rotating the SAMPLE RATE control full counterclockwise to POWER OFF.

b. Loosen locking screws on either side of the plug-in compartment (or single locking screw on left side) by turning fully counterclockwise.

e. Remove blank filler panel or plug-in unit installed.

d. Slide the Model 5261A into the compartment. Make certain the plug-in is properly aligned and tighten the locking screws.

2-8. COOLING.

2-9. The Video Amplifier plug-in unit is cooled by the ventilation of the ⓗ counter in which it is installed. Refer to the Operating and Service Manual of the Counter for cooling system maintenance instructions.

2-10. POWER REQUIREMENTS.

2-11. All voltages required to operate the Model 5261A are supplied by the circuits of the ⓗ counter in which the plug-in is installed.

2-12. ELECTRICAL CONNECTIONS.

2-13. The INPUT terminal on the front panel of the plug-in (see Figure 3-2) provides the only connection for the input signal. The front-panel OUTPUT 50 Ω connector supplies the Video Amplifier output for monitoring or external equipment. All connections to the counter are completed through the 50-pin jack at the rear of the plug-in unit.

SECTION III
OPERATION

3-1. MODEL 5261A CONTROLS.

3-2. Figure 3-2 indicates the functions of the connectors, meter, and SENSITIVITY control on the Model 5261A front panel.

3-3. OPERATING PROCEDURE.

3-4. The Video Amplifier plug-in unit is ac-coupled but does not change any functions of the counter in which it is installed. Using the plug-in, period, multiperiod, frequency, totalizing, and ratio measurements can be performed with input signals as low as one millivolt. Since the measurements can be made with or without the Video Amplifier installed, only frequency measurement is illustrated in Figure 3-3. For other measurement procedures, see the Operating and Service Manual for your Electronic Counter. Table 3-1 lists the frequency resolution for all settings of the counter TIME BASE control (Figure 3-3, item 3).

Table 3-1. Frequency Resolution

INPUT FREQUENCY = 11.1223344 Mc	
TIME BASE Setting	Counter Display and Resolution
.1 μs	no display
1 μs	11. Mc
10 μs	11.1 Mc
.1 ms	11.12 Mc
1 ms	11122. kc
10 ms	11122.3 kc
.1 s	11122.33 kc
1 s	11122.334 kc
10 s	11122.3344 kc

3-5. OPERATION WITH PULSE INPUT SIGNALS.

3-6. The Video Amplifier is designed to amplify sinusoidal input signals. However, pulse input signals can be amplified if the output signal is monitored to ensure a satisfactory output to the counter. Monitor the signal at the OUTPUT 50Ω connector with an oscilloscope and set the Video Amplifier SENSITIVITY control for a level which results in satisfactory counter operation. Because the output level meter is an average-responding device, it will read low with a pulse input signal. Do not use the meter as an output level indicator when amplifying pulses.

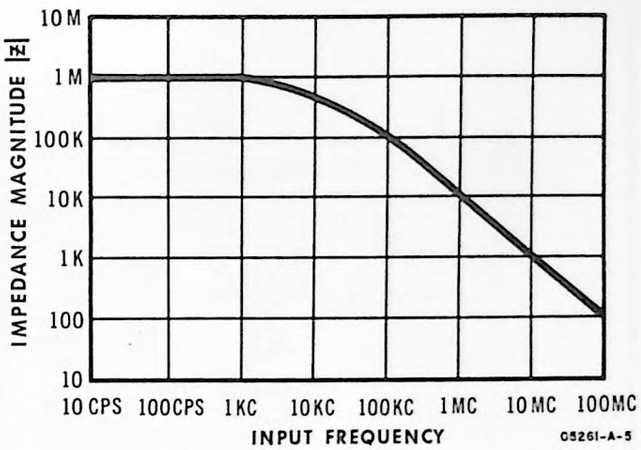


Figure 3-1. Input Impedance vs Input Frequency

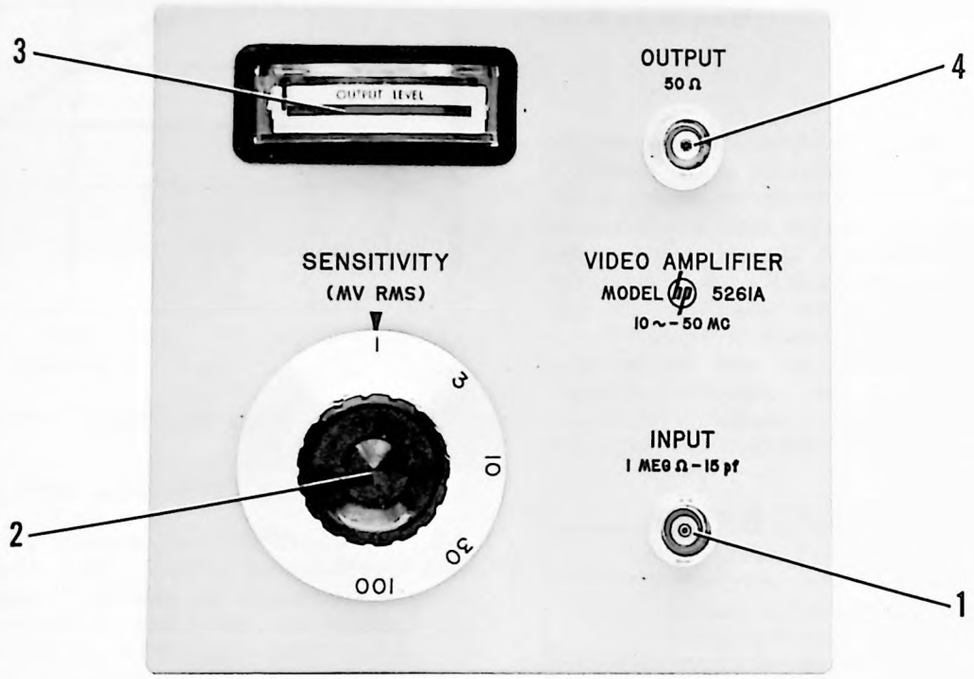
3-7. OPERATION WITH HIGH IMPEDANCE PROBE.

3-8. The ℗ 10003A 10:1 divider probe can be used with the Video Amplifier. The 10:1 divider probe serves to decrease the effects of resistive loading on the external circuit at low frequencies. When using the probe, Video Amplifier sensitivity is decreased by 1/10. As a result, the maximum sensitivity of the Video Amplifier is 10 mv.

3-9. VIDEO AMPLIFIER INPUT IMPEDANCE.

3-10. As illustrated in Figure 3-1, Video Amplifier input impedance decreases at higher frequencies. This decrease is due to the capacitive loading effect of the amplifier input. Thus when a signal source of fixed impedance is connected to the Video Amplifier INPUT, a meter at the signal source will not indicate the correct input level at the Video Amplifier. To avoid this error, monitor the input level at the Video Amplifier input with an RF Voltmeter such as the ℗ Model 411A to ensure a satisfactory input level. The Video Amplifier input can also be terminated in the signal source characteristic impedance but at frequencies near 50 Mc capacitive loading reduces the input impedance, the signal source is no longer terminated in its characteristic impedance, and a meter at the signal source is incorrect. Thus, the simplest method of ensuring a satisfactory input to the Video Amplifier is to monitor the signal level at the Video Amplifier input.

CONTROLS



1. INPUT signal connector: apply a 1-100 mv AC signal between 10 cps and 20 Mc (5243L) or 10 cps and 50 Mc (5245L).

2. SENSITIVITY control: calibrated in millivolts, this control determines the sensitivity of the Video Amplifier and is adjusted to keep the signal output to the Counter within limits acceptable to the Counter input circuit as indicated on the OUTPUT LEVEL meter.

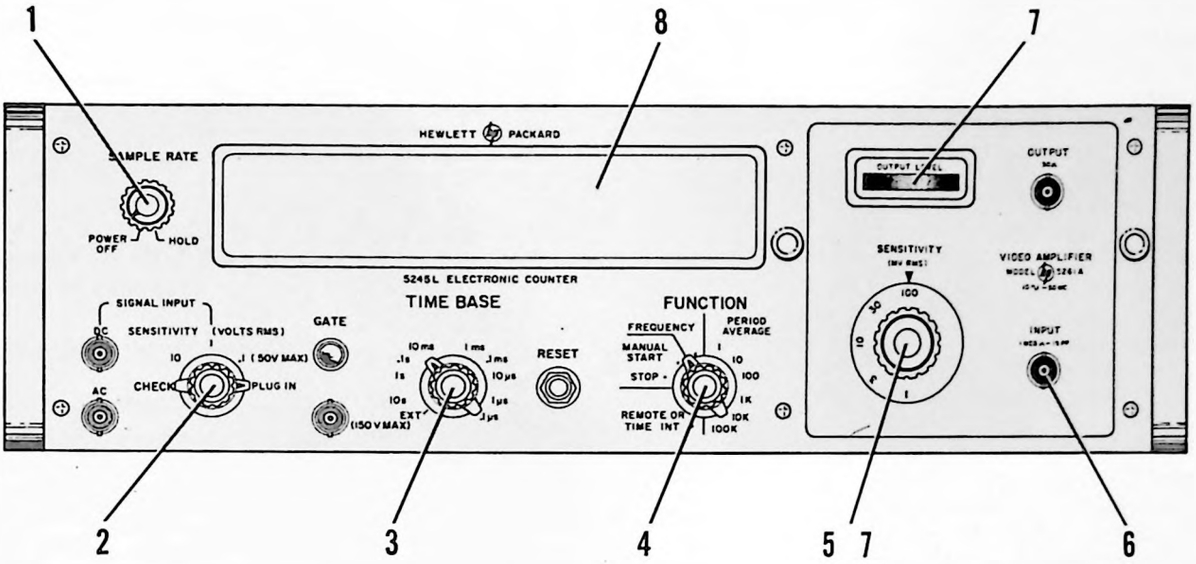
3. OUTPUT LEVEL meter: meter monitors the level of the Video Amplifier output to the Counter. When meter indicates in green portion of scale, Video Amplifier output to Counter is satisfactory.

4. OUTPUT 50 Ω connector: when terminated in 50 ohms, the signal at this connector is identical in frequency and amplitude to the Video Amplifier output to the Counter.

05261-A-6

Figure 3-2. Controls

OPERATING PROCEDURE



1. Apply power to Counter and Video Amplifier by turning SAMPLE RATE control slightly clockwise from POWER OFF position.
2. Set Counter SENSITIVITY to PLUG IN.
3. Set TIME BASE to 10 ms. *
4. Set FUNCTION to FREQUENCY.

*TIME BASE setting may vary depending upon desired resolution of INPUT signal frequency (Table 3-1).

5. Set Video Amplifier SENSITIVITY to 100 MV.
6. Connect signal to be measured to INPUT connector on Video Amplifier. DO NOT EXCEED 5 V rms.
7. Vary SENSITIVITY control until OUTPUT LEVEL meter reads in green portion of scale.
8. Observe frequency of INPUT signal as displayed by Counter.

05261-A-3

Figure 3-3. Frequency Measurement with Model 5261A

SECTION IV
PRINCIPLES OF OPERATION

4-1. INTRODUCTION.

4-2. The four functional sections of the Model 5261A are illustrated in Figure 5-4. The preamplifier, attenuator, video amplifier, and output amplifier circuits are combined to amplify AC signals as small as 1 millivolt and provide a usable output level to the counter input circuit. All dc voltages to operate the Model 5261A are supplied from the counter in which the unit is installed. These dc voltages are filtered by components on Amplifier assembly A4, which includes a series regulator in the 15-volt line.

4-3. PREAMPLIFIER ASSEMBLY A1.

4-4. The preamplifier circuit consists of a nuvistor cathode follower driving an emitter follower to provide a high impedance input and a low impedance output. Diodes A1CR1 and A1CR2 limit input signal peaks and prevent damage to A1Q1. Resistor A1R4 limits A1Q1 gate current during overload. Capacitors A1C2, A1C3, A1C4, and A1C5 filter variations from the dc voltage lines.

4-5. ATTENUATOR SWITCH ASSEMBLY A2.

4-6. Resistive attenuator A2 reduces the input signal and establishes the overall gain of the Video Amplifier. The amount of attenuation inserted is controlled by the Video Amplifier SENSITIVITY switch. RC networks A2C2, A2R10 and A2R9, A2C1 are selected to improve frequency response.

4-7. VIDEO AMPLIFIER ASSEMBLY A3.

4-8. The video amplifier consists of two amplifiers with three transistors each and feedback and drift compensation for gain stability. Feedback is provided by the RC combination of A3R5, A3C4, A3R13, A3C11 and transistors A3Q3, A3Q6 in the feedback loops of the two amplifiers. Drift compensation is also accomplished with the addition of A3Q3 and A3Q6. Positive feedback to amplifier No. 2 from output amplifier A4Q4 increases amplifier No. 2 gain at higher frequencies.

4-9. The addition of A3Q3 and A3Q6 in the feedback loops of the two amplifiers provides three functions: 1) act as negative feedback amplifiers to reduce the gain which reduces any drift caused by temperature changes in the two-stage amplifiers; 2) maintain the amplifier gain at low frequencies; and 3) filter ripple on the -14 volt line, in conjunction with A3C6 and A3C13.

4-10. OUTPUT AMPLIFIER ASSEMBLY A4.

4-11. Output amplifier assembly A4 consists of: 1) output amplifier circuit; 2) meter circuit; 3) plus 20-volt filter; and 4) series regulator. These four circuits are discussed in Paragraphs 4-12 through 4-15.

4-12. OUTPUT AMPLIFIER. Emitter follower A4Q4 provides the amplified input signal to the counter via rear panel plug P6, pin 1. This same signal is supplied to OUTPUT 50Ω jack J2 for monitoring with an oscilloscope or application to other equipment. Positive feedback from A4Q4 emitter to amplifier No. 2 in the video amplifier assembly increases the video amplifier gain at higher frequencies. Capacitors A4C9 and A4C10 are connected in parallel to improve the overall frequency response.

4-13. METER CIRCUIT. The signal at A4Q4 emitter is rectified by A4CR2 and A4CR3 and filtered by A4C12. This dc is supplied to OUTPUT LEVEL meter M1. Capacitors A4C11 and A4C13 are connected in parallel to improve the frequency response of the meter circuit. Meter Cal potentiometer A4R13 provides an adjustment for calibrating the OUTPUT LEVEL meter (Paragraph 5-12). Minus 15 volts is supplied to the meter circuit and establishes a bias on diodes A4CR2, 3. This prevents the meter indicating for very small output signals and permits a meter indication in the green scale for an output signal greater than 100 millivolts. Diode A4CR4 acts to protect the meter during input signals greater than 100 mv. A4CR4 anode is clamped at about -1.5 volts, which corresponds to approximately full scale. When the rectified signal output exceeds this value, A4CR4 conducts and protects the meter.

4-14. PLUS 20 VOLT FILTER. Transistors A4Q1, A4Q2, and associated components filter variations and noise from the +20-volt line. A voltage change at A4Q1 collector causes a change at A4Q2 base and A4Q2 changes conduction to oppose the variation. The emitter-collector voltage drop across A4Q2 is approximately 1 volt and the +20 volts becomes +19 volts at the drain of FET A1Q1. Resistors A4R2 and A4R3 form a dc voltage divider to establish the quiescent voltage at A4Q1 base. Capacitor A4C2 bypasses to ground ac variations at A4Q1 base.

4-15. SERIES REGULATOR. Series regulator A4Q3 provides regulated -14 volts for the Model 5261A circuits. Breakdown diode A4CR1 establishes a reference voltage at A4Q3 base. When the -15 volts changes, A4Q3 senses this change through A4R4 and increases conduction to oppose the change. Inductor A4L1 reduces high-frequency transients in the -14 volt regulated output.

Table 5-1. Recommended Test Equipment

Instrument Type	Required Characteristics	Use	Instrument Recommended
Electronic Counter		Provide power	ⓗⓟ Model 5243L or ⓗⓟ Model 5245L
DC Voltmeter	0 v to ±25v; 10M Ω input impedance; 1% accuracy	Troubleshooting	ⓗⓟ Model 412A
AC Voltmeter	1 mv to 500 mv; 10 cps to 1 Mc; 2% accuracy	Troubleshooting Circuit adjustment	ⓗⓟ Model 403B
RF Millivoltmeter	1 mv to 500 mv; 500 kc to 50 Mc; 3% accuracy	Troubleshooting; Circuit adjustment	ⓗⓟ Model 411A with ⓗⓟ 11025A Probe (formerly ⓗⓟ411A-21E)
Oscillator	10 cps to 100 kc; 1 mv to 500 mv	Troubleshooting; Circuit adjustment	ⓗⓟ Model 200CD
High Frequency Signal Generator	100 kc to 50 Mc; 1 mv to 500 mv	Troubleshooting; Circuit adjustment	ⓗⓟ Model 606A
Oscilloscope	10 cps to 10 Mc; 5 mv/cm	Troubleshooting;	ⓗⓟ Model 175A with ⓗⓟ Model 1752A
Coaxial Cable	Low Microphonics	Troubleshooting; Circuit adjustment; Operation	ⓗⓟ 10507A
Extender Cable	50-pin connectors; straight-through connections	Permits operation outside of counter	ⓗⓟ 10506B
Feed-through Termination	BNC to BNC; 50 Ω	Troubleshooting; Circuit adjustment	ⓗⓟ 10100A (2 required)
DC Power Supply	100 vdc	Performance Check	ⓗⓟ 711A

SECTION V
MAINTENANCE

5-1. INTRODUCTION.

5-2. This section of the manual provides maintenance and service information for the Model 5261A Video Amplifier. Included are troubleshooting procedures, a table of recommended test equipment, repair information, and in-cabinet performance checks which may be used to verify proper operation of the instrument.

5-3. TEST EQUIPMENT.

5-4. Recommended test equipment for checking performance and troubleshooting is listed in Table 5-1. Test instruments not listed that have specifications equal to or better than the required characteristics listed may be used.

5-5. ASSEMBLY IDENTIFICATION.

5-6. Throughout this manual, printed circuit assemblies are referred to by assembly number. For example, the Video Amplifier Assembly is referred to as A3. Connections to pins of the 50-pin plug on the rear of the instrument are referred to by the plug number and pin number; for example, pin 1 is referred to as P6(1).

5-7. IN-CABINET PERFORMANCE CHECK.

5-8. The performance checks listed in Table 5-2 verify proper operation of circuits in the Video Amplifier and may be used:

a. as part of an incoming inspection check of instrument specifications;

b. periodically, for instruments in systems where maximum reliability is of primary importance;

c. as part of a troubleshooting procedure to locate malfunctioning circuits, and

d. after any repairs or adjustments, before returning instrument to regular service.

5-9. ADJUSTMENTS.

5-10. HIGH FREQUENCY RESPONSE ADJUSTMENTS A3C4, A3C11.

5-11. Trimmer capacitors A3C4 and A3C11 in video amplifier assembly A3 provide the only adjustments for frequency response. Adjust these capacitors only when the bandwidth check (Table 5-2, In-Cabinet Performance Checks) indicates the frequency response is outside the ±3 db limits. The access hole for tuning A3C4 is on the bottom of the instrument and A3C11 access hole is on the left side. Use a plastic tuning wand for adjustments. Adjust A3C4 and A3C11 as follows:

a. Remove Video Amplifier plug-in from counter by loosening lock screws and sliding unit out of counter plug-in compartment.

b. Use ℔10506B extension cable and connect Video Amplifier rear plug to counter jack inside plug-in compartment.

c. Set counter controls as follows:

SAMPLE RATE. . . . slightly cw out of POWER OFF
SENSITIVITY. . . . . PLUG-IN
TIME BASE . . . . . .1 MS
FUNCTION . . . . . FREQUENCY

d. Set Video Amplifier SENSITIVITY to 3 MV.

e. Connect Model 411A RF Millivoltmeter through ℔10100A feedthrough termination to 50 Ω OUTPUT.

f. Connect Model 606A generator through ℔10100A feedthrough termination to Video Amplifier INPUT. Set frequency to 1000 kc and adjust output level for 150 mv indication on voltmeter (use -3 db mark as reference).

g. Slowly change generator frequency from 500 kc to 60 Mc. If voltmeter indicates less than -6 db or more than 0 db, adjust A3C11 to bring the voltmeter indication within these limits.

h. Set generator frequency to 30 Mc and if voltmeter indication is less than -6 db or more than 0 db, adjust A3C4.

i. Repeat steps g and h until the voltmeter indication is within the limits for both steps.

j. Slowly change generator frequency between 500 kc and 60 Mc. Observe that voltmeter indication remains between -6 db and 0 db over this frequency range.

5-12. OUTPUT METER CALIBRATION.

5-13. Meter Cal potentiometer A4R13 is located on output amplifier assembly A4 and is accessible from the top when the Video Amplifier is outside the counter plug-in compartment. Adjust A4R13 as follows:

a. Perform operations indicated in Paragraph 5-11, steps a, b, and c.

b. Connect Model 200CD oscillator output to the Video Amplifier INPUT. Set oscillator frequency to 100 kc.

c. Connect Model 403B voltmeter to the Video Amplifier 50 Ω OUTPUT through ℔10100A feedthrough termination.

Table 5-2. In-Cabinet Performance Checks

1. BANDWIDTH: 10 cps to 50 Mc
a. Set counter controls as follows: SAMPLE RATE slightly clockwise out of POWER OFF SENSITIVITY to PLUG-IN TIME BASE to .1 MS FUNCTION to FREQUENCY b. Set Video Amplifier SENSITIVITY to 3 MV. Connect ℗10100A 50-ohm feedthrough terminations to INPUT and OUTPUT. c. Connect Model 200CD Oscillator output to Video Amplifier INPUT and Model 403B Voltmeter to 50Ω OUTPUT. d. Adjust Oscillator frequency to 100 kc and for indication of 120 mv on Voltmeter (use -4 db line as reference). e. Slowly change Oscillator frequency from 100 kc to 10 cps. Video Amplifier output level should remain between -7 db and -1 db limits. f. Disconnect Model 200CD and connect Model 606A to Video Amplifier INPUT through the ℗10100A feedthrough termination. Disconnect Model 403B from OUTPUT and connect Model 411A RF Voltmeter. g. Set generator to 1000 kc and adjust output level for -4 db reference as in step d. Remove Voltmeter from OUTPUT and connect to INPUT. Record input level for reference level. h. Connect Voltmeter to 50 Ω OUTPUT and slowly change generator frequency from 1000 kc to 100 kc. Repeat above 100 kc to 50 Mc. Connect Voltmeter to INPUT periodically to check reference level. Video Amplifier output should remain between -7 db and -1 db limits.
2. INPUT SENSITIVITY: 1 mv to 300 mv rms.
a. Set Counter controls as in 1 a. b. Set Video Amplifier SENSITIVITY to 1 MV. c. Connect ℗10100A feedthrough terminations to Video Amplifier INPUT and 50Ω OUTPUT. d. Connect Model 200CD to INPUT and Model 403B Voltmeter to 50Ω OUTPUT. Adjust Oscillator frequency to 100 kc and for indication of 100 mv on Voltmeter. e. Disconnect Voltmeter from 50 Ω OUTPUT and connect Oscilloscope to 50 Ω OUTPUT. Oscilloscope display should be a sine wave with no clipping. f. Connect Voltmeter to Oscillator output. Voltmeter should indicate less than 1 mv. g. Connect Voltmeter to 50 Ω OUTPUT. h. Set Video Amplifier SENSITIVITY to 100 mv. i. Connect Oscillator to INPUT and set to 100 kc. j. Adjust Oscillator output for 300 mv indication on Voltmeter. k. Observe that Counter correctly counts input frequency.
3. MAXIMUM INPUT: 5 volts rms, 100 vdc
a. Set counter controls as in 1 a. b. Connect BNC tee to Video Amplifier INPUT, set Model 711A DC Power Supply for 100 volts, add 1 megohm series resistor, and connect power supply to Video Amplifier. c. Use a 0.1 μf, 200 wvdc capacitor and connect Oscillator and Voltmeter to INPUT. Set Oscillator for 100 kc and 5 volts rms as indicated on Voltmeter. d. Observe that counter correctly displays input frequency. (cont'd)

Table 5-2. In-Cabinet Performance Checks (cont'd)

4. MONITOR: OUTPUT METER indicates acceptable signal level to Counter.
a. Set Counter controls as in 1 a and Video Amplifier SENSITIVITY to 3 MV. b. Set Oscillator to 100 kc and connect to Video Amplifier INPUT with 50-ohm termination. c. Connect Voltmeter to 50 Ω OUTPUT with 50-ohm feedthrough termination. d. Adjust Oscillator output level for 420 mv on Voltmeter. e. Observe that OUTPUT LEVEL meter indicates at right edge of green portion of scale and Counter correctly displays input frequency. f. Set Oscillator output level for 120 mv indication on Voltmeter. g. Observe that OUTPUT LEVEL meter indicates at left edge of green portion of scale and Counter correctly displays input frequency.
5. ACCURACY: retains accuracy of Model 5243L or Model 5245L Electronic Counter.
a. Set Counter controls as in 1 a. b. Set Oscillator frequency to 100 kc and connect to Video Amplifier INPUT. c. Set Video Amplifier SENSITIVITY to 100 MV. d. Connect Voltmeter to Oscillator output and set signal level to 100 mv. e. Observe and record Counter display. f. Set Counter SENSITIVITY to .1V. Disconnect Oscillator output from Video Amplifier INPUT and connect to Counter AC SIGNAL INPUT. g. Observe that Counter display corresponds with value recorded in step e.
6. AUXILIARY OUTPUT:
a. 50 Ω OUTPUT on front panel for monitoring amplified signal to Counter or for driving external equipment checked in 1 under BANDWIDTH specification check. b. 1 mv signal at Video Amplifier INPUT provides at least 100 mv at 50 Ω OUTPUT, checked in 2 under INPUT SENSITIVITY specification check. c. Maximum undistorted output is 300 mv into 50-ohm load, checked in 2 under INPUT SENSITIVITY specification check.

d. Set Video Amplifier SENSITIVITY to 100 MV. Adjust Oscillator output for 420 mv on Voltmeter.

e. OUTPUT LEVEL meter should indicate at right edge of green scale. If not, adjust A4R13 for this indication.

f. Adjust Oscillator output for OUTPUT LEVEL indication at left edge of green scale. Voltmeter should indicate not less than 100 mv.

5-14. TROUBLESHOOTING AND REPAIR.

5-15. TROUBLESHOOTING.

5-16. When operation or performance checks indicate an instrument malfunction, refer to Table 5-3 (Troubleshooting) for the more common indications of trouble and checks to isolate the trouble. After the trouble has been isolated to a particular assembly or stage, voltage and resistance checks can be made to determine the defective component.

5-17. PRINTED CIRCUIT COMPONENT REPLACEMENT.

5-18. Component lead holes in the Model 5261A printed circuit boards have plated walls to ensure good electrical contact between conductors on opposite sides of the board. To prevent damage to this plating and to the replacement component, apply heat sparingly and work carefully. The following replacement procedure is recommended:

a. Remove defective component by applying heat carefully to the component connection and lifting the component from the board.

b. Melt solder in component lead holes. Use clean dry soldering iron to remove excess solder. Clean holes with toothpick or wooden splinter. Do not use metal tool for cleaning. This may damage through-hole plating.

c. Bend lead of replacement component to the correct shape and insert component leads into component lead holes. Using heat and solder sparingly, solder

leads in place. Heat may be applied to either side of board. A heat sink (longnose pliers, commercial heat-sink tweezers, etc.) should be used when replacing transistors and diodes to prevent conducting excessive heat from the soldering iron to the component.

d. Through-hole plating breaks are indicated by the separation from the board of the round conductor pad. To repair breaks, press conductor pads against board and solder replacement component lead to conductor pads on both sides of the board.

Table 5-3. Troubleshooting

Trouble Symptom	Possible Cause
No output to Counter or 50Ω OUTPUT jack	DC voltages from Counter, FET A1Q1 dead, A4Q4 shorted, P6(1) or J2 shorted
Low Video Amplifier gain	A1Q1 weak, A3Q1-A3Q6 weak, A4R5 increased value
Output low at frequencies near 10 cps	A4C6 open, A1C1, A3R8 increased value
Output low at frequencies above 100 kc	A2C1 changed value, high frequency trimmers A3C4 and A3C11 not correctly adjusted
Output noisy	A1Q1 noisy, poor ground connection at P6(3), A3C5 or A3C12 changed value

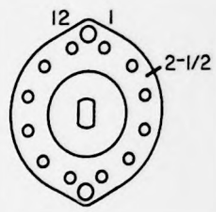
SYMBOLS

- FRONT PANEL
- REAR PANEL
- KNOB CONTROL
- SCREWDRIVER ADJUST
- MAIN SIGNAL PATH
- FEEDBACK PATH
- CONDUCTING ELEMENT
- CW — WIPER MOVES TOWARD "CW" WHEN CONTROL IS ROTATED CLOCKWISE
- POWER LINE GROUND
- CIRCUIT COMMON GROUND
- TEST POINT
- A — "AND" GATE
- I — INHIBIT GATE
- O — "OR" GATE

WAVEFORMS SHOWN ARE TYPICAL

SWITCH DESIGNATIONS

A3S1BR(2-1/2)



A3S1	SWITCH S1 WITHIN ASSEMBLY A3
B	2ND WAFER FROM FRONT (A=1ST, ETC)
R	REAR OF WAFER (F=FRONT)
(2-1/2)	TERMINAL LOCATION ($2\frac{1}{2}$) (VIEWED FROM FRONT)

REFERENCE DESIGNATIONS

REFERENCE DESIGNATIONS WITHIN ASSEMBLIES ARE ABBREVIATED. ADD ASSEMBLY NUMBER TO ABBREVIATION FOR COMPLETE DESCRIPTION.

ASSEMBLY	ABBREVIATION	COMPLETE DESCRIPTION
A25	C1	A25C1
A25A1	CR1	A25A1CR1
NO PREFIX	J3	J3

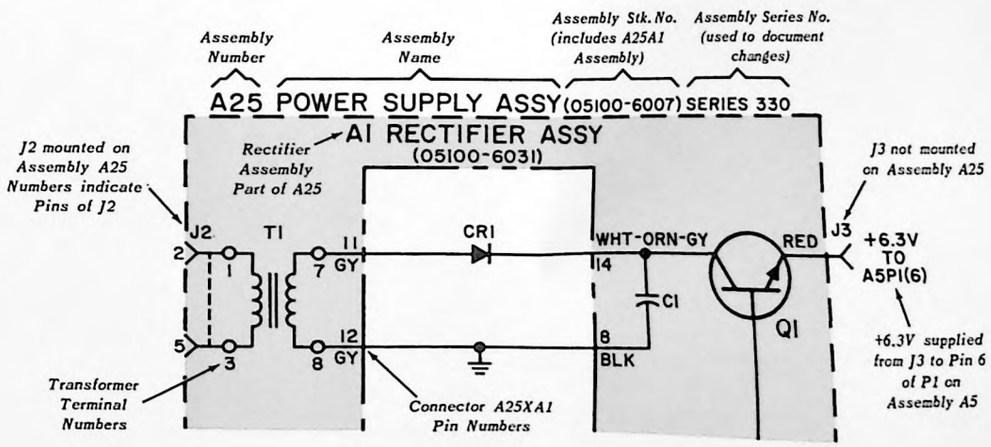


Figure 5-1. Schematic Diagram Notes

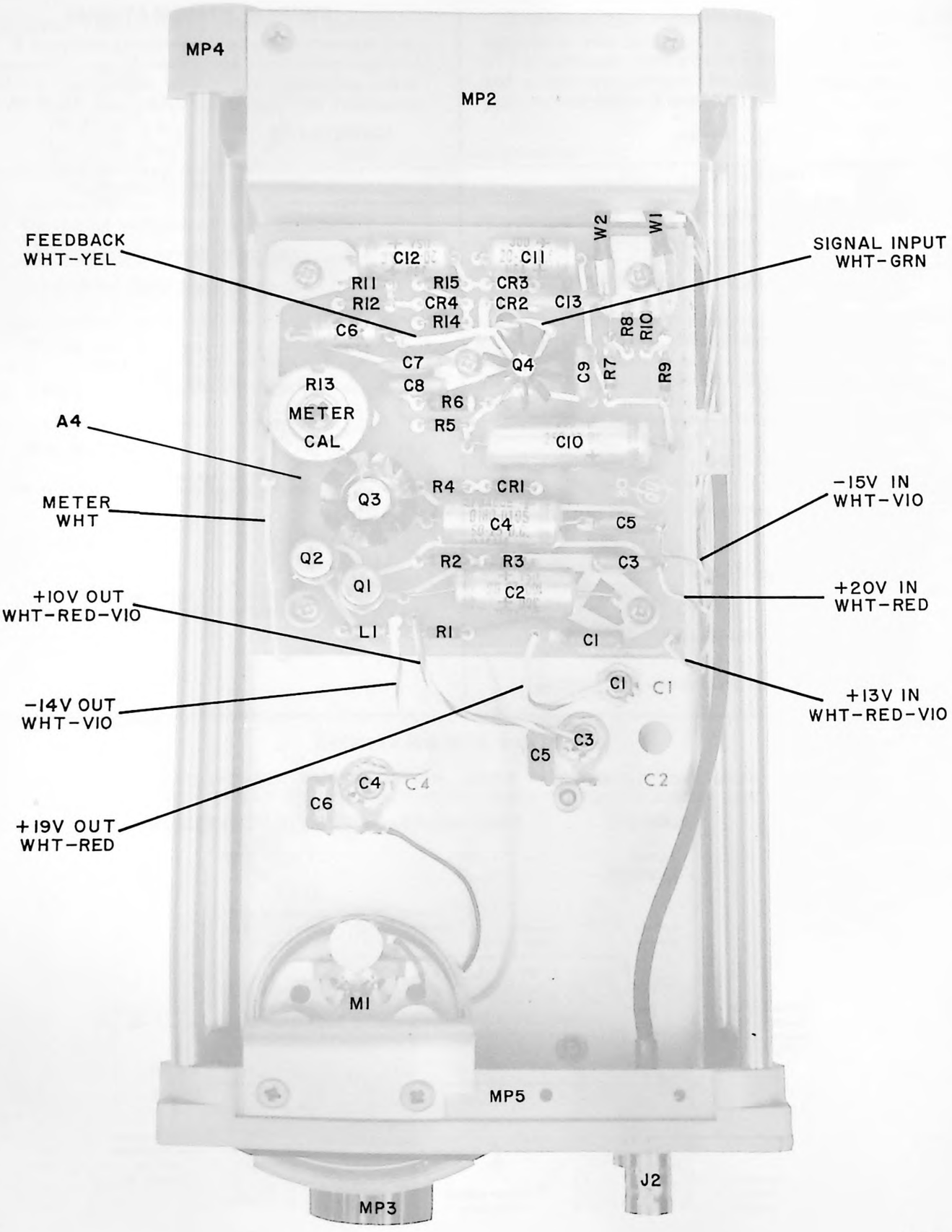


Figure 5-2. Top View, Component Location

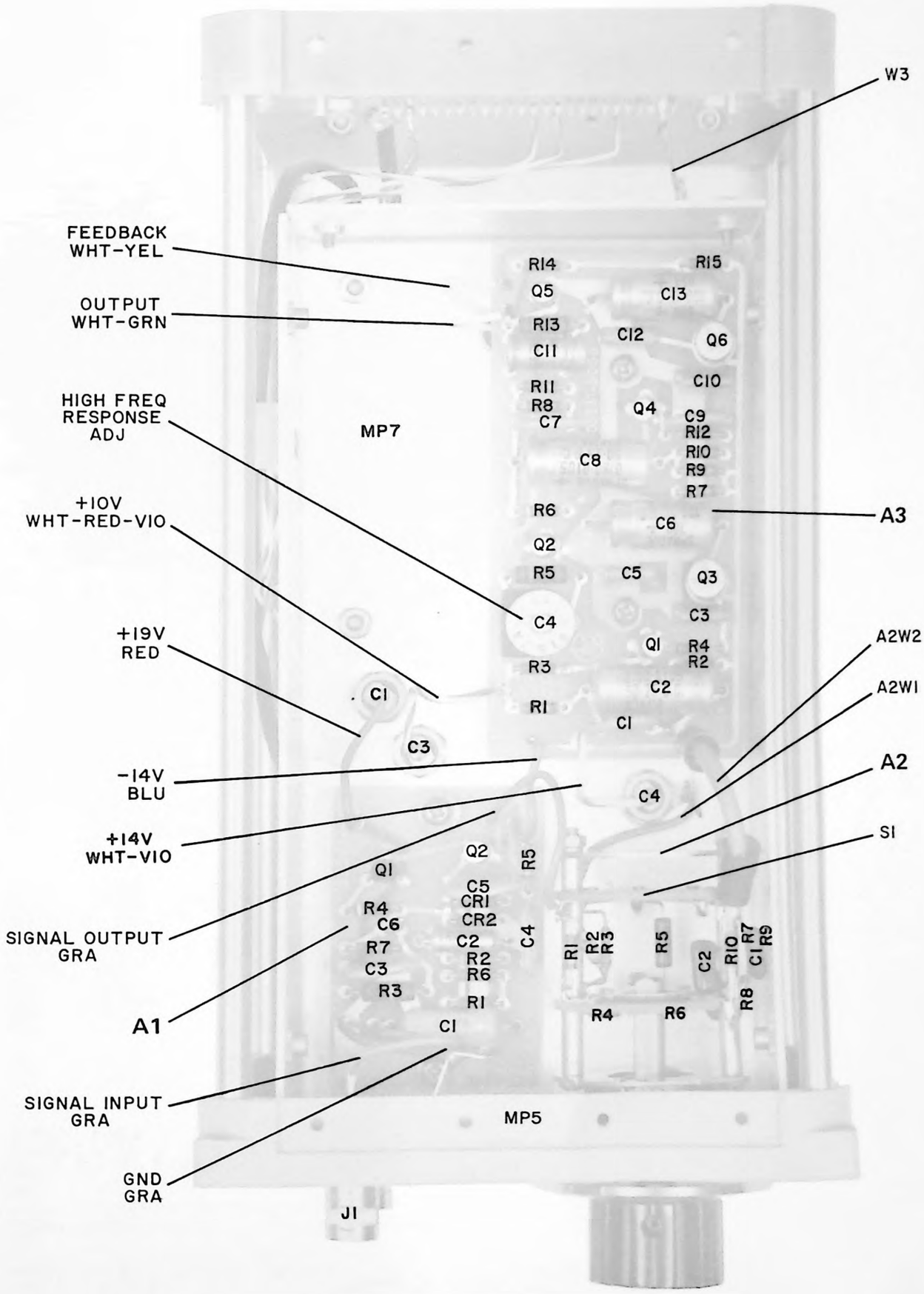
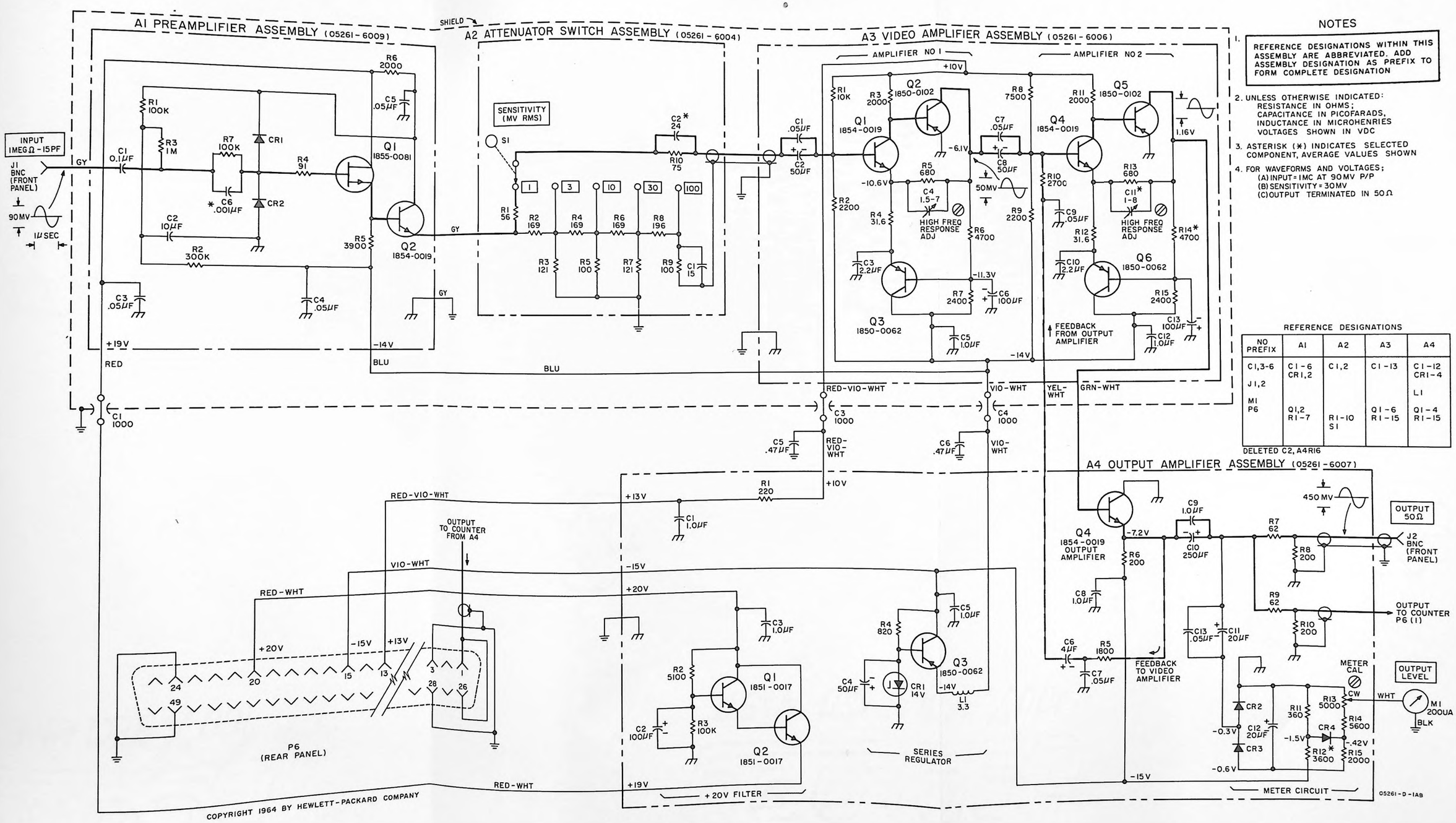


Figure 5-3. Bottom View, Component Location



NOTES

1. REFERENCE DESIGNATIONS WITHIN THIS ASSEMBLY ARE ABBREVIATED. ADD ASSEMBLY DESIGNATION AS PREFIX TO FORM COMPLETE DESIGNATION
2. UNLESS OTHERWISE INDICATED: RESISTANCE IN OHMS; CAPACITANCE IN PICOFARADS, INDUCTANCE IN MICROHENRIES VOLTAGES SHOWN IN VDC
3. ASTERISK (*) INDICATES SELECTED COMPONENT, AVERAGE VALUES SHOWN
4. FOR WAVEFORMS AND VOLTAGES; (A) INPUT=1MC AT 90MV P/P (B) SENSITIVITY=30MV (C) OUTPUT TERMINATED IN 50Ω

REFERENCE DESIGNATIONS

NO PREFIX	A1	A2	A3	A4
C1,3-6	C1-6 CR1,2	C1,2	C1-13	C1-12 CR1-4 L1
J1,2				
M1 P6	Q1,2 R1-7	R1-10 S1	Q1-6 R1-15	Q1-4 R1-15

DELETED C2, A4R16

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Figure 5-4. Video Amplifier Schematic

SECTION VI
REPLACEABLE PARTS

6-1. INTRODUCTION.

6-2. This section contains information for ordering replacement parts. Table 6-1 lists parts in alpha-numerical order of their reference designators and indicates the description and hp stock number of each part, together with any applicable notes. Table 6-2 lists parts in alpha-numerical order of their hp stock number and provides the following information on each part;

a. Description of the part (see list of abbreviations below).

b. Typical manufacturer of the part in a five-digit code; see list of manufacturers in Table 6-3.

c. Manufacturer's part number.

d. Total quantity used in the instrument (TQ column).

6-3. Miscellaneous parts are listed at the end of Table 6-1.

6-4. ORDERING INFORMATION.

6-5. To obtain replacement parts, address order or inquiry to your local Hewlett-Packard Field Office (see maps at rear of this manual for addresses). Identify parts by their Hewlett-Packard stock numbers.

6-6. To obtain a part that is not listed, include:

a. Instrument model number.

b. Instrument serial number.

c. Description of the part.

d. Function and location of the part.

REFERENCE DESIGNATORS

A = assembly	E = misc electronic part	MP = mechanical part	TB = terminal board
B = motor	F = fuse	P = plug	TP = test point
C = capacitor	FL = filter	Q = transistor	V = vacuum tube, neon bulb, photocell, etc
CP = coupling	J = jack	R = resistor	
CR = diode	K = relay	RT = thermistor	W = cable
DL = delay line	L = inductor	S = switch	X = socket
DS = device signaling (lamp)	M = meter	T = transformer	Y = crystal

ABBREVIATIONS

A = amperes	GE = germanium	N/C = normally closed	RMO = rack mount only
A.F.C = automatic frequency control	GL = glass	NE = neon	RMS = root-mean-square
AMPL = amplifier	GRD = ground(ed)	NI PL = nickel plate	
		N/O = normally open	S-B = slow-blow
B.F.O. = beat frequency oscillator	H = henries	NPO = negative positive zero (zero temperature coefficient)	SCR = screw
BE CU = beryllium copper	HEX = hexagonal		SE = selenium
BH = binder head	HG = mercury		SECT = section(s)
BP = bandpass	HR = hour(s)	NRFR = not recommended for field replacement	SEMICON = semiconductor
BRS = brass			SI = silicon
BWO = backward wave oscillator	IF = intermediate freq	NSR = not separately replaceable	SIL = silver
	IMPG = impregnated		SL = slide
CCW = counter-clockwise	INCD = incandescent		SPL = special
CER = ceramic	INCL = include(s)	OBD = order by description	SST = stainless steel
CMO = cabinet mount only	INS = insulation(ed)	OH = oval head	SR = split ring
COEF = coefficient	INT = internal	OX = oxide	STL = steel
COM = common			
COMP = composition	K = kilo = 1000	P = peak	TA = tantalum
CONN = connector		PC = printed circuit	TD = time delay
CP = cadmium plate	LIN = linear taper	PF = picofarads = 10^{-12} farads	TGL = toggle
CRT = cathode-ray tube	LK WASH = lock washer		TI = titanium
CW = clockwise	LOG = logarithmic taper	PH BRZ = phosphor bronze	TOL = tolerance
	LPF = low pass filter	PHL = Phillips	TRIM = trimmer
DEPC = deposited carbon		PIV = peak inverse voltage	TWT = traveling wave t
DR = drive	M = milli = 10^{-3}	P/O = part of	
	MEG = meg = 10^{-6}	POLY = polystyrene	U = micro = 10^{-6}
ELECT = electrolytic	METFLM = metal film	PORC = porcelain	
ENCAP = encapsulated	MFR = manufacturer	POS = position(s)	VAR = variable
EXT = external	MINAT = miniature	POT = potentiometer	VDCW = dc working volt
	MOM = momentary	PP = peak-to-peak	
F = farads	MTG = mounting	PT = point	W/ = with
FH = flat head	MY = "mylar"	RECT = rectifier	W = watts
FIL H = fillister head		RF = radio frequency	WW = wirewound
FXD = fixed	N = nano (10^{-9})	RH = round head	W/O = without

01194-9

Table 6-1. Reference Designation Index

Reference Designation	Stock No.	Description #	Note
A1	05261-6009	ASSY:PREAMPLIFIER BOARD	
	05261-2009	BLANK PRINTED CIRCUIT BOARD	
A1C1	0170-0055	C:FXD MY .1UF 20% 200VDCW	
A1C2	0180-0374	C:FXD 10UF 20VDCW	
A1C3	0150-0096	C:FXD CER .05UF 100VDCW	
A1C4	0150-0096	C:FXD CER .05UF 100VDCW	
A1C5	0150-0096	C:FXD CER .05UF 100VDCW	
A1C6	0160-0975	C:FXD CER .001UF 20% 75VDCW	
A1CR1	1901-0376	DIODE-SEMICON DEVICE SIL	
A1CR2	1901-0376	DIODE-SEMICON DEVICE SIL	
A1Q1	1855-0081	TRANSISTOR 2N5245	
A1Q2	1854-0019	TRANSISTOR 2N2368	
A1R1	0683-1045	R:FXD COMP 100K OHM 5% 1/4W	
A1R2	0683-3045	R:FXD COMP 300K OHM 5% 1/4W	
A1R3	0757-0344	R:FXD DEPC 1M OHM 1% 1/2W	
A1R4	0683-9105	R:FXD COMP 91 OHMS 5% 1/4W	
A1R5	0683-3925	R:FXD COMP 3.9 OHMS 5% 1/4W	
A1R6	0683-2025	R:FXD COMP 2000 OHMS 5% 1/4W	
A1R7	0683-1045	R:FXD COMP 100K OHMS 5% 1/4W	
A2	05261-6004	ASSY:ATTENUATOR SWITCH	
A2C1	0140-0202	C:FXD MICA 15 PF 5% 500VDCW	
A2C2	0160-0196	C:FXD MICA 24PF 5% 300VDCW	
A2C2	-	FACTORY SELECTED PART:TYPICAL VALUE GIVEN	
A2R1	0683-5605	R:FXD COMP 56 OHM 5% 1/4W	
A2R2	0757-0176	R:FXD MET FLM 169 OHM 1% 1/4W	
A2R3	0757-0069	R:FXD MET FLM 121 OHM 1% 1/4W	
A2R4	0757-0176	R:FXD MET FLM 169 OHM 1% 1/4W	
A2R5	0757-0178	R:FXD MET FLM 100 OHM 1% 1/4W	
A2R6	0757-0176	R:FXD MET FLM 169 OHM 1% 1/4W	
A2R7	0757-0069	R:FXD MET FLM 121 OHM 1% 1/4W	
A2R8	0757-0179	R:FXD MET FLM 196 OHM 1% 1/4W	
A2R9	0757-0178	R:FXD MET FLM 100 OHM 1% 1/4W	
A2R10	0683-7505	R:FXD COMP 75 OHMS 5% 1/4W	
A2S1	3100-0404	SWITCH-ROTARY 2 SECT 5 POS	
A2W1	5243A-16D	CABLE:GROUND	
A2W2	05261-6001	CABLE:ATTENUATOR	
A3	05261-6006	ASSY:VIDEO AMPLIFIER BOARD	
	05261-2004	BLANK PRINTED CIRCUIT BOARD	
A3C1	0150-0096	C:FXD CER 0.05UF 100VDCW	
A3C2	0180-0105	C:FXD ELECT 50UF 25VDCW	
A3C3	0160-0126	C:FXD CER 2.2 UF 20% 25VDCW	
A3C4	0130-0011	C:VAR CER 1.5-7 PF	
A3C5	0160-0127	C:FXD CER 1UF 20% 25VDCW	
A3C6	0180-0061	C:FXD ELECT 100UF +100%-10% 15VDCW	

See list of abbreviations in introduction to this section

Table 6-1. Reference Designation Index (Cont'd)

Reference Designation	℗ Stock No.	Description #	Note
A3C7	0150-0096	C:FXD CER 0.05UF 100VDCW	
A3C8	0180-0105	C:FXD ELECT 50UF 25VDCW	
A3C9	0150-0096	C:FXD CER 0.05UF 100VDCW	
A3C10	0160-0128	C:FXD CER 2.2 UF 20% 25VDCW	
A3C11	0121-0048	C:VAR GLASS .6-6.5 PF 750VDCW	
A3C11	-	FACTORY SELECTED PART:TYPICAL VALUE GIVEN	
A3C12	0160-0127	C:FXD CER 1UF 20% 25VDCW	
A3C13	0180-0061	C:FXD ELECT 100UF +100%-10% 15VDCW	
A3Q1	1854-0019	TRANSISTOR:2N2368	
A3Q2	1850-0102	TRANSISTOR:2N2455	
A3Q3	1850-0062	TRANSISTOR:GERMANIUM	
A3Q4	1854-0019	TRANSISTOR:2N2368	
A3Q5	1850-0102	TRANSISTOR:2N2455	
A3Q6	1850-0062	TRANSISTOR:GERMANIUM	
A3R1	0683-1035	R:FXD COMP 10K OHMS 5% 1/4W	
A3R2	0683-2225	R:FXD COMP 2.2K OHM 5% 1/4W	
A3R3	0683-2025	R:FXD COMP 2000 OHMS 5% 1/4W	
A3R4	0757-0180	R:FXD MET FLM 31.6 OHM 1% 1/8W	
A3R5	0757-0126	R:FXD MET FLM 680 OHMS 2% 1/2W	
A3R6	0683-4725	R:FXD COMP 4700 OHMS 5% 1/4W	
A3R7	0683-2425	R:FXD COMP 2400 OHMS 5% 1/4W	
A3R8	0683-7525	R:FXD COMP 7.5K OHMS 5% 1/4W	
A3R9	0683-2225	R:FXD COMP 2.2K OHM 5% 1/4W	
A3R10	0683-2725	R:FXD COMP 2700 OHMS 5% 1/4W	
A3R11	0683-2025	R:FXD COMP 2000 OHMS 5% 1/4W	
A3R12	0757-0180	R:FXD MET FLM 31.6 OHM 1% 1/8W	
A3R13	0757-0126	R:FXD MET FLM 680 OHMS 2% 1/2W	
A3R14	0683-4725	R:FXD COMP 4700 OHMS 5% 1/4W	
A3R15	0683-2425	R:FXD COMP 2400 OHMS 5% 1/4W	
A4	05261-6007	ASSY:OUTPUT AMPLIFIER BOARD	
	05261-2005	BLANK PRINTED CIRCUIT BOARD	
A4C1	0160-0127	C:FXD CER 1UF 20% 25VDCW	
A4C2	0180-0094	C:FXD ELECT 100UF 25VDCW	
A4C3	0160-0127	C:FXD CER 1UF 20% 25VDCW	
A4C4	0180-0105	C:FXD ELECT 50UF 25VDCW	
A4C5	0160-0127	C:FXD CER 1UF 20% 25VDCW	
A4C6	0180-0114	C:FXD ELECT 4UF +100-10% 25VDCW	
A4C7	0150-0096	C:FXD CER 0.05UF 100VDCW	
A4C8	0160-0127	C:FXD CER 1UF 20% 25VDCW	
A4C9	0160-0127	C:FXD CER 1UF 20% 25VDCW	
A4C10	0180-0212	C:FXD ELECT 250 MF 12VDCW	
A4C11	0180-0045	C:FXD ELECT 20 UF 25VDCW	
A4C12	0180-0045	C:FXD ELECT 20 UF 25VDCW	
A4C13	0150-0096	C:FXD CER 0.05 UF 100VDCW	
A4CR1	1902-0040	SEMICON DEVICE DIODE SILICON JUNCTION	
A4CR2	1910-0022	SEMICON DEVICE:DIODE GE 100MA 6PIV 3.5NS	
A4CR3	1910-0022	SEMICON DEVICE:DIODE GE 100MA 6PIV 3.5NS	
A4CR4	1910-0016	SEMICON DEVICE:DIODE GERMANIUM	
A4L1	9140-0143	COIL:FXD RF 3.3 UH	

 # See list of abbreviations in introduction to this section

Table 6-1. Reference Designation Index (Cont'd)

Reference Designation	Stock No.	Description #	Note
A4Q1	1851-0017	TRANSISTOR:2N1304	
A4Q2	1851-0017	TRANSISTOR:2N1304	
A4Q3	1850-0062	TRANSISTOR:GERMANIUM	
A4Q3	1205-0011	HEAT SINK:FOR Q3	
A4Q4	1854-0019	TRANSISTOR:2N2368	
A4Q4	1205-0012	HEAT SINK:FORQ4	
A4R1	0683-2215	R:FXD COMP 220 OHMS 5% 1/4W	
A4R2	0683-5125	R:FXD COMP 5100 OHMS 5% 1/4W	
A4R3	0683-1045	R:FXD COMP 100K OHMS 5% 1/4W	
A4R4	0683-8215	R:FXD COMP 820 OHMS 5% 1/4W	
A4R5	0683-1825	R:FXD COMP 1800 OHMS 5% 1/4W	
A4R6	0758-0062	R:FXD MET FLM 200 OHMS 5% 1/2W	
A4R7	0683-6205	R:FXD COMP 62 OHMS 5% 1/4W	
A4R8	0683-2015	R:FXD COMP 200 OHMS 5% 1/4W	
A4R9	0683-6205	R:FXD COMP 62 OHMS 5% 1/4W	
A4R10	0683-2015	R:FXD COMP 200 OHMS 5% 1/4W	
A4R11	0683-3615	R:FXD COMP 360 OHMS 5% 1/4W	
A4R12	0683-3625	R:FXD COMP 3600 OHM 5% 1/4W	
A4R12	-	FACTORY SELECTED PART:TYPICAL VALUE GIVEN	
A4R13	2100-0331	R:VAR WW 5000 OHM 10% LIN 1W METER CAL.	
A4R14	0683-5625	R:FXD COMP 5600 OHMS 5% 1/4W	
A4R15	0683-2025	R:FXD COMP 2K OHM 5% 1/4W	
C1	0150-0005	C:FXD CER 1000 PF 25% 500VDCW	
C3	0150-0005	C:FXD CER 1000 PF 25% 500VDCW	
C4	0150-0005	C:FXD CER 1000 PF 25% 500VDCW	
C5	0160-0174	C:FXD CER 0.47UF 80% 25VDCW	
C6	0160-0174	C:FXD CER 0.47UF 80% 25VDCW	
J1	1250-0171	CONNECTOR:BNC INPUT	
J2	1250-0102	CONNECTOR:BNC OUTPUT 50 OHM	
M1	1120-0143	METER:200 UA EDGE VIEW	
	5040-0185	BEZEL: METER	
MP1	5261-6006	ASSY SHIELD COVER:WITH BRAID	
MP2	5261-0004	BRACKET:SHIELD MOUNTING	
MP3	05261-0001	DIAL SENSITIVITY	
MP4	5265A-83A	GUIDE:MOLDED PLASTIC:4-1/2 IN.X4-1/2IN	
MP5	05261-2011	PANEL:FRONT STANDARD (MINT GRAY)	
MP5	05261-2006	PANEL:FRONT OPTION A85 (LIGHT GRAY)	
MP7	05261-0005	SHIELD:BOX:7 IN. X 3-1/2 IN.	
MP8	5262A-47A	SPACER:ROUND:7-1/4IN. LG X 1/4IN.DIA	
MP9	05261-0007	BRACKET:METER MOUNTING	
P6	1251-0099	CONNECTOR MALE 50 PIN	
W1	05261-6002	CABLE:OUTPUT: 10 IN. LONG	
W2	05261-6003	CABLE REAR:4 IN. LONG	
W3	5243A-16D	CABLE:GROUND:ON P6 PIN 26 AND 49	

See list of abbreviations in introduction to this section

Table 6-2 Replaceable Parts

Stock No.	Description #	Mfr.	Mfr. Part No.	TQ	RS
0121-0048	C:VAR GLASS .8-8.5 PF 750VDCW	73899	VC9GW	1	1
0130-0011	C:VAR CER 1.5-7 PF	28480	0130-0011	1	1
0140-0202	C:FXD MICA 15 PF 5% 500VDCW	04062	DM15C150J 500V	1	1
0150-0005	C:FXD CER 1000 PF 25% 500VDCW	04222	TYPE CFS-1	3	1
0150-0096	C:FXD CER 0.05UF 100VDCW	91418	-TA	8	2
0160-0127	C:FXD CER 1UF 20% 25VDCW	56289	5C13	7	2
0160-0128	C:FXD CER 2.2 UF 20% 25VDCW	56289	5C15	2	1
0160-0174	C:FXD CER 0.47UF 80% 25VDCW	56289	5C11A	2	1
0160-0196	C:FXD MICA 24PF 5% 300VDCW	04062	DM15C240J	1	1
0160-0975	C:FXD CER .001UF 20% 75VDCW	12574	SSM-001-98	1	1
0170-0055	C:FXD MY 0.1UF 20% 200VDCW	56289	192P10402	1	
0180-0045	C:FXD ELECT 20 UF 25VDCW	56289	D3269C	2	1
0180-0061	C:FXD ELECT 100UF +100%-10% 15VDCW	56289	30D172A1	2	1
0180-0094	C:FXD ELECT 100UF 25VDCW	56289	30D186A1	1	1
0180-0105	C:FXD ELECT 50UF 25VDCW	56289	S97441	3	1
0180-0114	C:FXD ELECT 4UF +100-10% 25VDCW	56289	30D405G025BA4	1	1
0180-0212	C:FXD ELECT 250 MF 12VDCW	56289	30D257G012DH4	1	
0180-0374	C:FXD ELECT 10UF 20VDCW	56289	150D106X9020B2-DYS	1	1
0683-1035	R:FXD COMP 10K OHMS 5% 1/4W	01121	CB 1035	1	1
0683-1045	R:FXD COMP 100K OHMS 5% 1/4W	01121	CB 1045	3	1
0683-1825	R:FXD COMP 1800 OHMS 5% 1/4W	01121	CB 1825	1	1
0683-2015	R:FXD COMP 200 OHMS 5% 1/4W	01121	CB 2015	2	1
0683-2025	R:FXD COMP 2000 OHMS 5% 1/4W	01121	CB 2025	4	1
0683-2215	R:FXD COMP 220 OHMS 5% 1/4W	01121	CB 2215	1	1
0683-2225	R:FXD COMP 2.2K OHM 5% 1/4W	01121	CB 2225	2	1
0683-2425	R:FXD COMP 2400 OHMS 5% 1/4W	01121	CB 2425	2	1
0683-2725	R:FXD COMP 2700 OHMS 5% 1/4W	01121	CB 2715	1	
0683-3045	R:FXD COMP 300K OHMS 5% 1/4W	01121	CB 3045	1	1
0683-3615	R:FXD COMP 360 OHMS 5% 1/4W	01121	CB 3615	1	1
0683-3625	R:FXD COMP 3600 OHMS 5% 1/4W	01121	CB 3625	1	1
0683-3925	R:FXD COMP 3900 OHMS 5% 1/4W	01121	CB 3925	2	1
0683-4725	R:FXD COMP 4700 OHMS 5% 1/4W	01121	CB 4725	1	1
0683-5125	R:FXD COMP 5100 OHMS 5% 1/4W	01121	CB 5125	1	
0683-5605	R:FXD COMP 56 OHM 5% 1/4W	01121	CB 5605	1	1
0683-5625	R:FXD COMP 5600 OHMS 5% 1/4W	01121	CB 5625	1	1
0683-6205	R:FXD COMP 62 OHMS 5% 1/4W	01121	CB 6205	2	1
0683-7505	R:FXD COMP 75 OHMS 5% 1/4W	01121	CB 7505	1	1
0683-7525	R:FXD COMP 1 MEGOHM 5% 1/4W	01121	CB 7525	1	1
0683-8215	R:FXD COMP 820 OHMS 5% 1/4W	01121	CB 8215	1	
0683-9105	R:FXD COMP 91 OHMS 5% 1/4W	01121	CB 9105	1	1
0757-0069	R:FXD MET FLM 121 OHM 1% 1/4W	19701	MF6C T-0	2	1
0757-0126	R:FXD MET FLM 680 OHMS 2% 1/2W	07115	C 20	2	1
0757-0176	R:FXD MET FLM 169 OHM 1% 1/4W	75042	CEB T-0	3	1
0757-0178	R:FXD MET FLM 100 OHM 1% 1/4W	75242	CEBT-0	2	1
0757-0179	R:FXD MET FLM 196 OHM 1% 1/4W	75042	CEBT-0	1	
0757-0180	R:FXD MET FLM 31.6 OHM 1% 1/8W	75042	CEAT-0	2	
0757-0344	R:FXD MET FLM 1 MEGOHM 1% 1/4W	01121	CB 0344	1	
0758-0062	R:FXD MET FLM 200 OHMS 5% 1/2W	07115	C 20	1	
1120-0143	METER:200 UA EDGE VIEW	60741	120	1	
1200-0086	SOCKET:NUVISTOR 5 PIN	71785	133-65-11-026	1	
1205-0011	HEAT SINK:FOR Q3	98978	TXBF-032-025B	1	

See list of abbreviations in introduction to this section

Table 6-2. Replaceable Parts (Cont'd)

Stock No.	Description #	Mfr.	Mfr. Part No.	TQ	RS
1205-0012	HEAT SINK:FOR Q4	05820	MODEL NF-201	1	1
1250-0102	CONNECTOR:BNC OUTPUT 50 OHM	91737	7011	1	1
1250-0171	CONNECTOR:BNC INPUT	91737	11246	1	1
1251-0099	CONNECTOR:MALE 50 PIN	02660	57 10500	1	1
1850-0062	TRANSISTOR:GERMANIUM	28480	1850-0062	3	3
1855-0081	TRANSISTOR:FET	01295	2N5245	1	
1850-0102	TRANSISTOR:2N2455	28480	1850-0101	2	2
1851-0017	TRANSISTOR:2N1304	01295	2N1304	2	2
1854-0019	TRANSISTOR:2N2368	07263	S-5781	4	4
1901-0376	SEMICON DEVICE:DIODE SILICON	28480	1901-0376	2	1
1902-0040	SEMICO DEVICE:DIODE SILICON JUNCTION	28480	1902-0040	1	3
1910-0016	SEMICON DEVICE:DIODE GERMANIUM	93332	D2361	1	
1910-0022	SEMICON DEVICE:DIODE GE 100MA 6FIV 3.5NS	28480	1910-0022	2	2
1921-0015	ELECTRON TUBE: 8056 NUVISTOR TRIODE	86684	8056	1	1
2100-0331	R:VAR WW 5000 OHM 10% LIN 1W METER CAL.	28480	2100-0331	1	1
3100-0404	SWITCH-ROTARY 2 SECT 5 POS	28480	3100-0404	1	1
5040-0185	BEZEL: METER	28480	5040-0185	1	
5261-0004	BRACKET: SHIELD MOUNTING	28480	5261-0004	1	
5261-6008	ASSY SHIELD COVER,WITH BRAID	28480	5261-6008	1	
9140-0143	COIL:FXD RF 3.3 UH	28480	9140-0143	1	1
05261-0001	DIAL SENSITIVITY	28480	05261-0001	1	
05261-0005	SHIELD:BOX,7 IN. X 3-1/2 IN.	28480	05261-0005	1	
05261-0007	BRACKET:METER MOUNTING	28480	05261-0007	1	
05261-2006	PANEL:FRONT ENGRAVED, OPTION A85 (LIGHT	28480	05261-2006	1	
05261-2004	BLANK PRINTED CIRCUIT BOARD GRAY)	28480	05261-2004	1	
05261-2005	BLANK PRINTED CIRCUIT BOARD	28480	05261-2005	1	
05261-2009	BLANK PRINTED CIRCUIT BOARD	28480	05261-2009	1	
05261-2011	PANEL:FRONT STANDARD (MINT GRAY)	28480	05261-2011	1	
05261-6001	CABLE:ATTENUATOR	28480	05261-6001	1	1
05261-6002	CABLE,OUTPUT, 10 IN. LONG	28480	05261-6002	1	1
05261-6003	CABLE REAR,4 IN. LONG	28480	05261-6003	1	1
05261-6004	ASSY:ATTENUATOR SWITCH	28480	05261-6004	1	
05261-6006	ASSY:VIDEO AMPLIFIER BOARD	28480	05261-6006	1	
05261-6007	ASSY:OUTPUT AMPLIFIER BOARD	28480	05261-6007	1	
05261-6009	ASSY:PREAMPLIFIER BOARD	28480	05261-6009	1	
5243A-16D	CABLE:GROUND	28480	5243A-16D	1	1
5243A-16D	CABLE,GROUND,ON P6 PIN 26 AND 49	28480	5243A-16D	1	1
5262A-47A	SPACER:ROUND,7 1/4IN. LG X 1/4IN.DIA	28480	5262A-47A	4	
5262A-83A	GUIDE:MOLDED PLASTIC,4-1/2 IN.X4-1/2IN	28480	5262A-83A	1	

See list of abbreviations in introduction to this section

Table 6-3. Manufacturer's Code List

Code No.	Manufacturer	Address
01121	Allen Bradley Co.	Milwaukee, Wis.
01295	Texas Instruments, Inc., Transistor Products Div.	Dallas, Texas
02660	Amphenol-Borg Electronics Corp.	Chicago, Ill.
04062	Elmenco Products Co.	New York, N.Y.
04222	Hi-Q Division of Aerovox	Myrtle Beach, S.C.
05820	Wakefield Engineering Inc.	Wakefield, Mass.
07115	Corning Glass Works Electronic Components Dept.	Bradford, Pa.
07263	Fairchild Semiconductor Corp.	Mountain View, Calif.
12574	Gulton Ind., Inc., Data System Div.	Albuquerque, N.M.
19701	Electra Manufacturing Co.	Kansas City, Mo.
28480	Hewlett-Packard Co.	Palo Alto, Calif.
56289	Sprague Electric Co.	North Adams, Mass.
60741	Tripplett Electrical Inc.	Bluffton, Ohio
71785	Cinch Mfg. Corp.	Chicago, Ill.
73899	JFD Electronics Corp.	Brooklyn, N.Y.
75042	International Resistance Co.	Philadelphia, Pa.
86684	Radio Corp. of America, RCA Electron Tube Div.	Harrison, N.J.
91418	Radio Materials Co.	Chicago, Ill
91737	Gremar Mfg. Co., Inc.	Wakefield, Mass.
93332	Sylvania Electric Prod. Inc., Semiconductor Div.	Woburn, Mass.
98978	International Electronic Research Corp.	Burbank, Calif.

APPENDIX I

This manual applies directly to the 5261A Video Amplifier having serial number prefix 1124A. This manual with the following changes also applies to 5261A having serial number prefix 301, 311, 510, 960, and 1104.

FOR SERIAL PREFIX	PERFORM CHANGE
301, 311	1, 2, 4
510	2, 4
960	3, 4
1104	4

CHANGE 1:

Figure 1 of Appendix 1 — Change A4R16 to a chassis part and designate R1.

Tables 6-1, 6-2 — Change: MP5 Front Panel to HP Part No. 05261-2003.
Change: MP9 Meter Mounting Bracket to HP Part No. 05261-0006.
Delete: A4R16
Add: R1 HP Part No. 0760-0012, R fxd, metal film 51 ohm 2% 1W.

CHANGE 2:

Page 6-2, Table 6-1 — Delete items A1 through A1R7

Add the following

A1	05261-6005 05261-2002	ASSY:PREAMPLIFIER BOARD BLANK PRINTED CIRCUIT BOARD
A1C1	0170-0055	C:FXD MY 0.1UF 20% 200VDCW
A1C2	0160-0127	C:FXD CER 1UF 20% 25VDCW
A1C3	0150-0096	C:FXD CER 0.05UF 100VDCW
A1C4	0150-0096	C:FXD 0.05UF 100VDCW
A1C5	0150-0096	C:FXD CER 0.05UF 100VDCW
A1CR1	1910-0016	SEMICON DEVICE DIODE GERMANIUM
A1CR2	1910-0016	SEMICON DEVICE DIODE GERMANIUM
A1Q1	1854-0019	TRANSISTOR:2N2368
A1R1	0683-8245	R:FXD COMP 820K OHMS 5% 1/4W
A1R2	0683-1545	R:FXD COMP 150K OHMS 5% 1/4W
A1R3	0757-0344	R:FXD MET FLM 1 MEGOHM 1% 1/4W
A1R4	0683-9105	R:FXD COMP 91 OHMS 5% 1/4W
A1R5	0683-3625	R:FXD COMP 3600 OHMS 5% 1/4W
A1R6	0683-9115	R:FXD COMP 910 OHMS 5% 1/4W
A1V1	1921-0015	ELECTRON TUBE: 8056 NUVISTOR TRIODE
A1XV1	1200-0086	SOCKET:NUVISTOR 5 PIN

CHANGE 2:
(Continued)

Page 6-4, Table 6-1	Add A4R16 0760-0012 R:FXD MET FLM 51 OHM 2% 1W Add C2 0150-0005 C:FXD CER 1000 PF 500VDCW Add MP6 05261-2001 PLT MTG FOR A1
Page 6-5, Table 6-2	Change Table 6-2 to reflect above part changes.
Page 5-6, Figure 5-2	Replace Figure 5-2 with Figure 1 of Appendix 1
Page 5-7, Figure 5-3	Replace Figure 5-3 with Figure 2 of Appendix 1
Page 5-7, Figure 5-4	Replace Figure 5-4 Video Amplifier Schematic with Figure 3 of Appendix 1

CHANGE 3

Page 6-2, Table 6-1	Delete A1C6 0160-0975 .001UF 20% 75VDCW Delete A1R7 0683-1045 100K OHM 5% 1/4W
Page 6-5, Table 6-2	Change Table 6-2 to reflect above part changes
Page 5-7, Figure 5-3	Replace A1 portion of component locator with Figure 4 of Appendix 1
Page 5-7, Figure 5-4	Replace Figure 5-4 Video Amplifier Schematic with Figure 5 of Appendix 1

CHANGE 4

Page 6-4, Table 6-1	Delete from MP5 description "OPTION A85 (LIGHT GRAY)". Delete "MP5 05261-2011 PANEL:FRONT STANDARD (MINT GRAY)".

Figure 1. Top View, Component Location

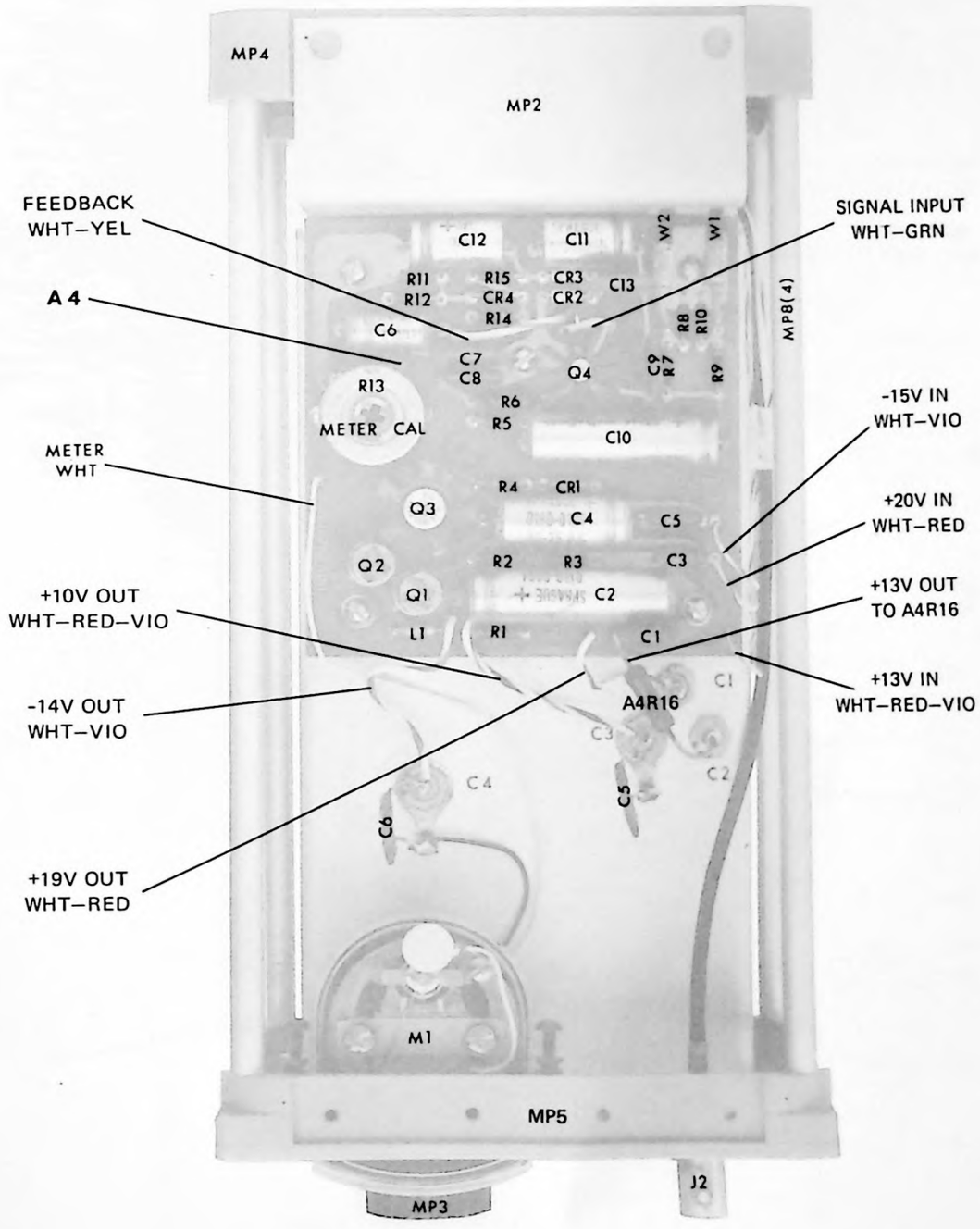


Figure 2. Bottom View, Component Location

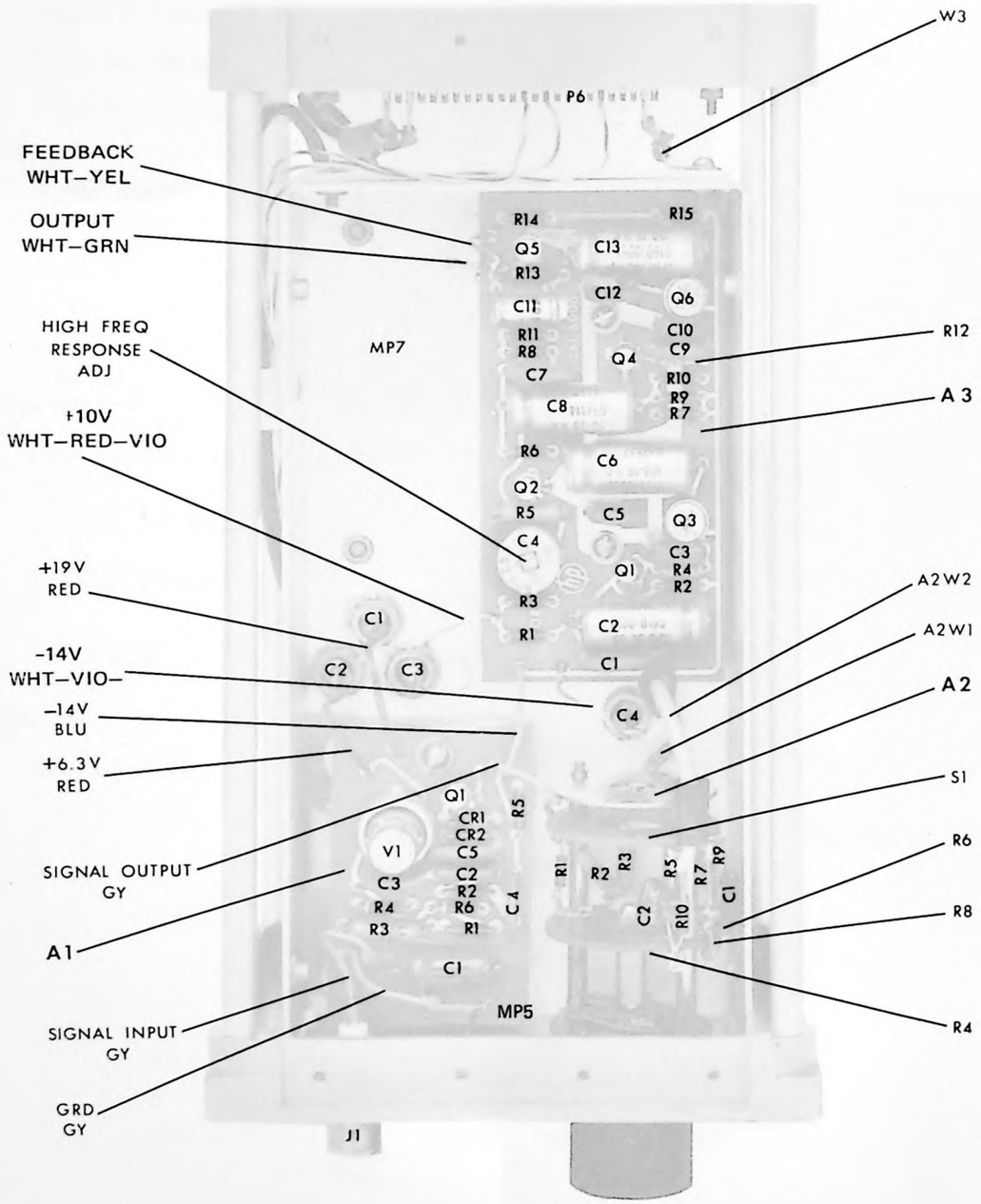


Figure 3. Video Amplifier Schematic

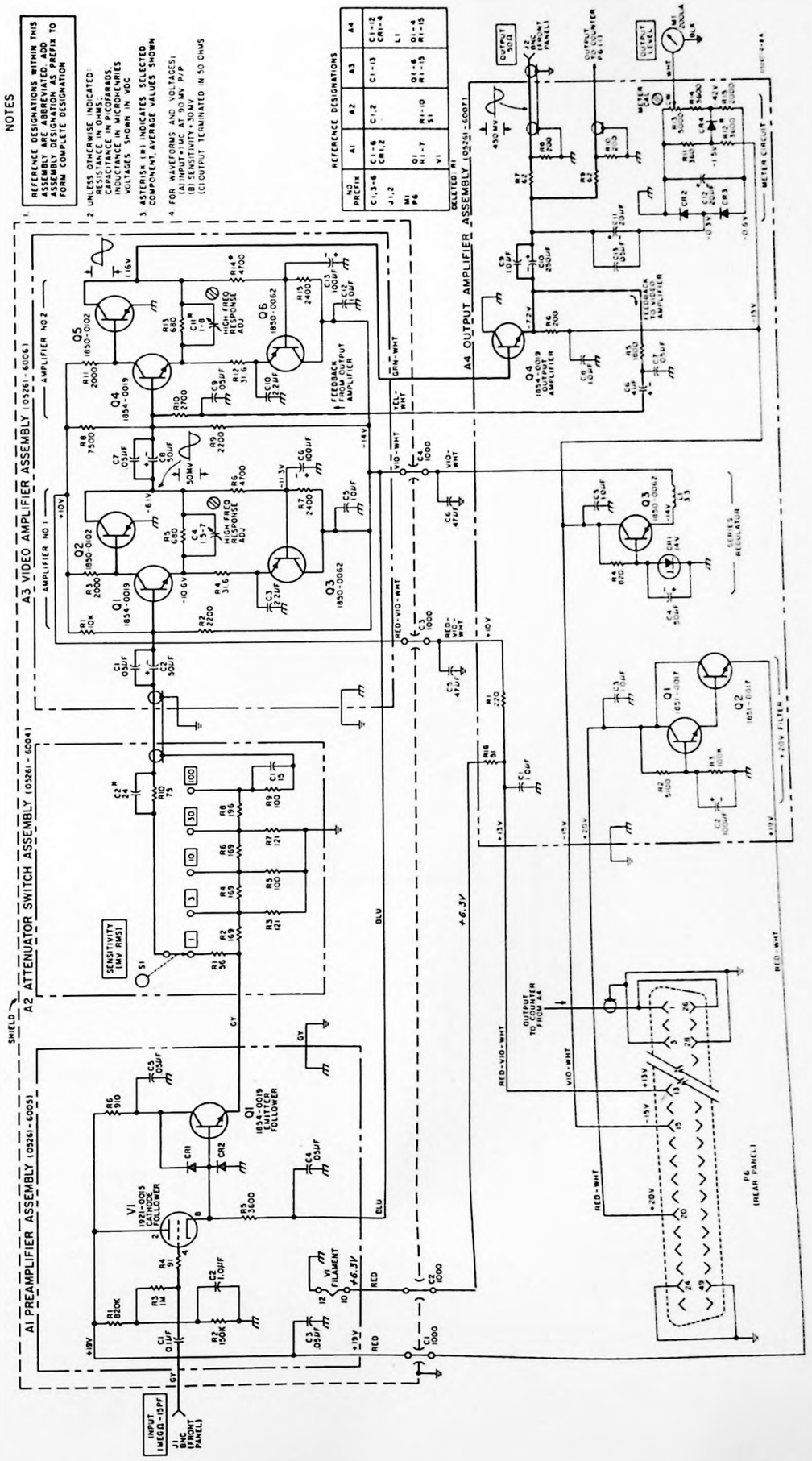


Figure 4. A1 Preamplifier, Component Location

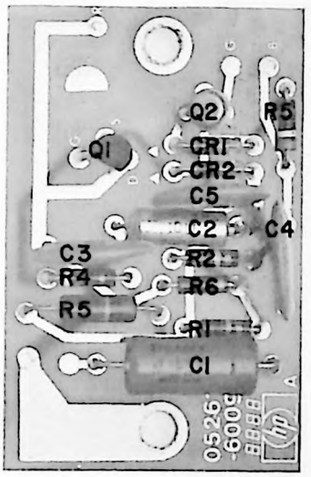
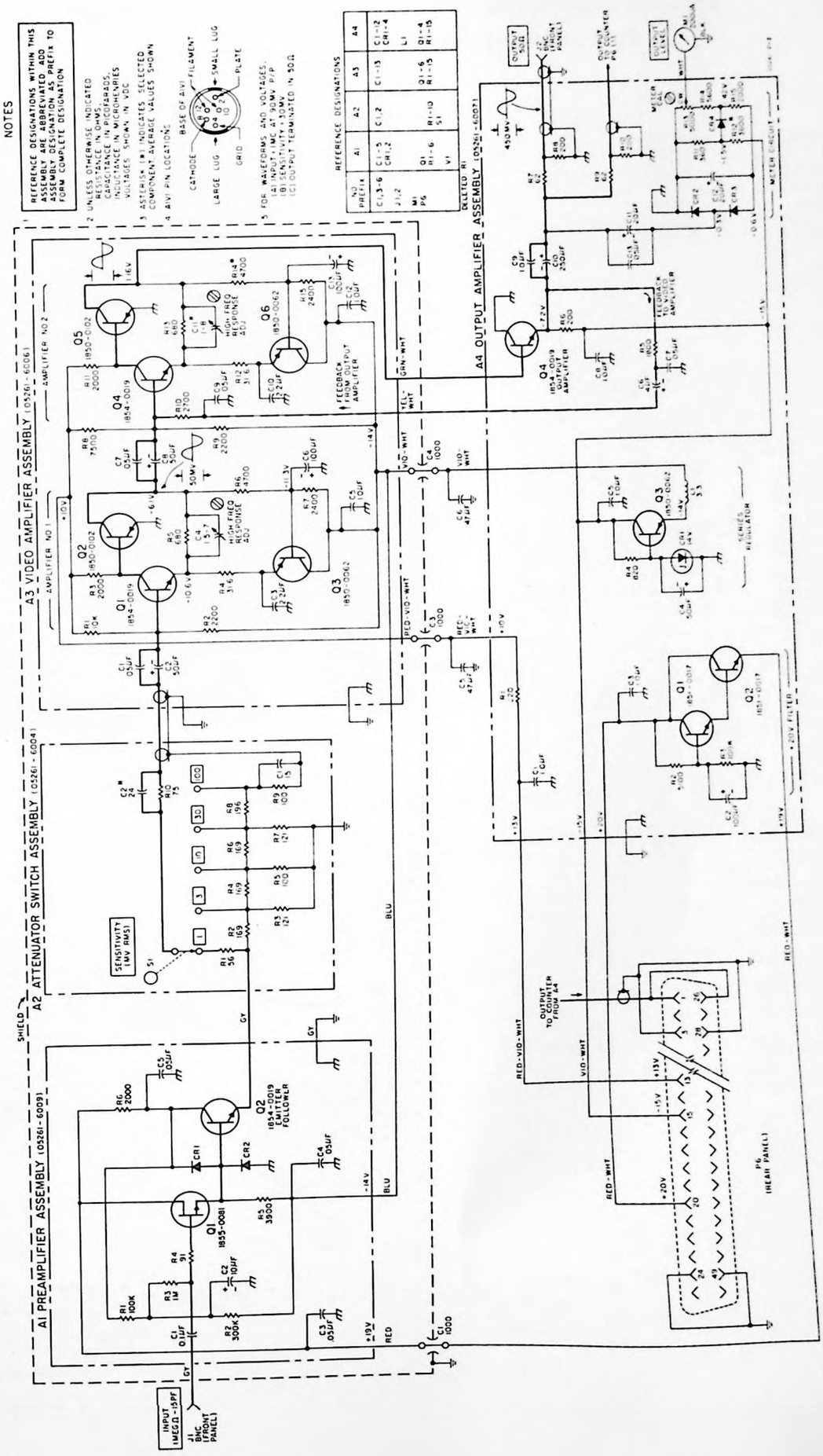


Figure 5. Video Amplifier Schematic



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UNITED KINGDOM
Hewlett Packard Ltd.
224 Bath Road
Slough, SL1 4 DS, Bucks
Tel: Slough (0753) 33341
Cable: HEWPIE Slough
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Hewlett-Packard Ltd.
"The Graftons"
Stamford New Road
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SOCIALIST COUNTRIES PLEASE CONTACT:
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Telex: 61514

OTHER AREAS NOT LISTED, CONTACT:
Hewlett-Packard
INTERCONTINENTAL
3200 Hillview Ave.
Palo Alto, California 94304
Tel: (415) 326-7000
(Feb. 71 493-1501)
TWX: 910-373-1267
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